

# Using the KAD/HBM/102

TEC/NOT/076

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## 47.1 Overview

The KAD/HBM/102 is a single-channel bus monitor module designed to monitor a Garmin™ G1000 High Speed Data Bus (HSDB) network link. It features a full-duplex 10BaseT, IEEE 802.3 compatible interface to connect to the HSDB network. It can be configured to act as a PC node on the network, sending and responding to PING and ACKnowledgment code (ACK) requests, and parsing up to 1,023 complete messages. It also features a 100BaseT output on which all HSDB traffic received on the 10BaseT input can be retransmitted across the FTI network for recording.

## 47.2 Garmin G1000 HSDB protocols overview

The Garmin G1000 HSDB protocols are essentially Hardware Manager (HWM) HSDB data wrapped in standard Ethernet packets. As shown in Figure 47-1 on page 2, there are two types of packet format: embedded and PC interface. The KAD/HBM/102 can be configured to capture either format. (For descriptions of abbreviations used in Figure 47-1 on page 2 and Figure 47-2 on page 3, see “47.4 Abbreviations” on page 6.)

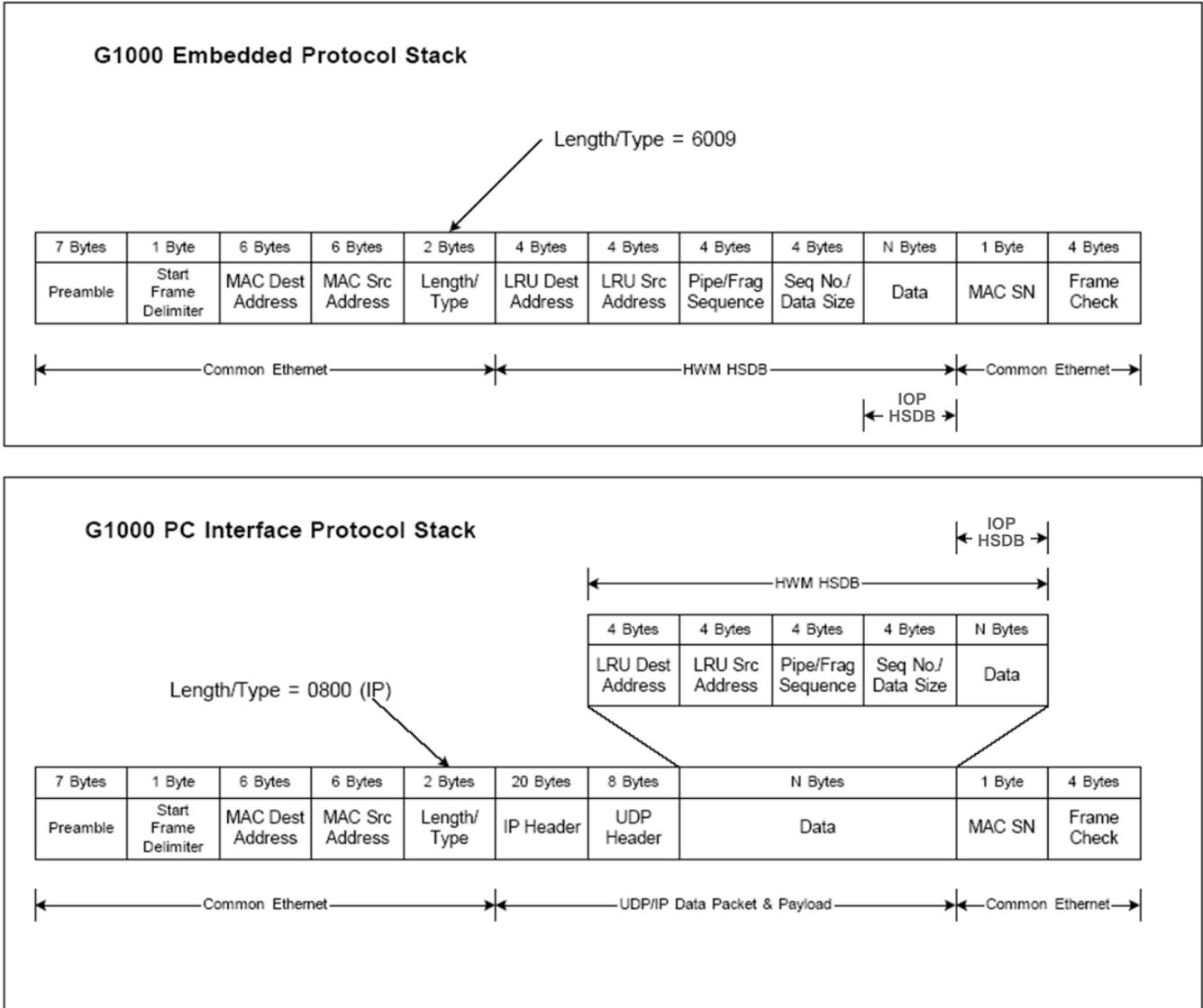


Figure 47-1: Embedded and PC interface packet formats

The HWM HSDB protocols shown in both the embedded and PC interface packet formats in Figure 47-1 on page 2, contain the data that must be extracted by the KAD/HBM/102. These protocols and how they are processed by the KAD/HBM/102 are explained in the following figure.

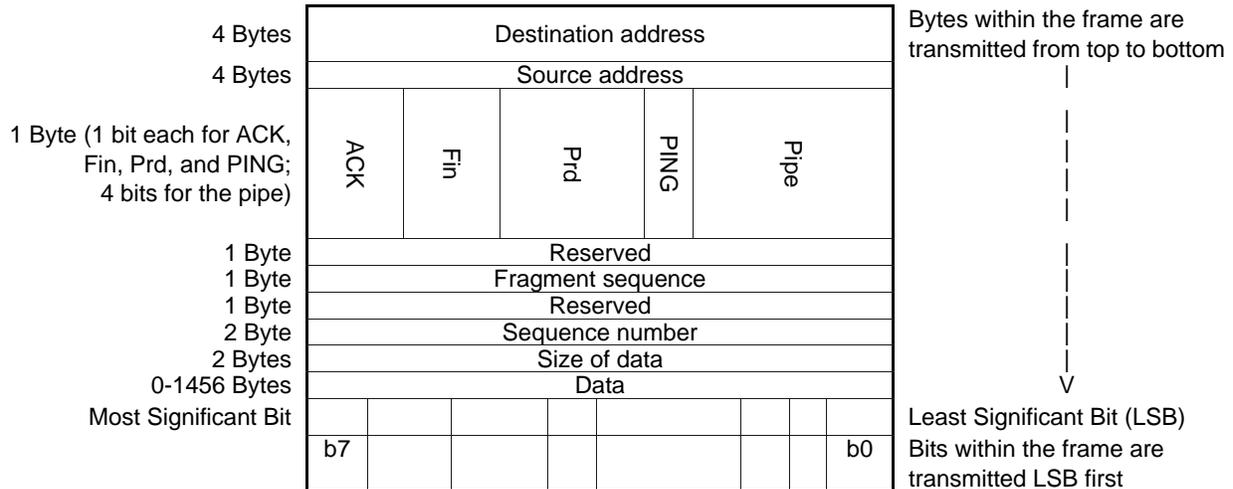


Figure 47-2: HWM HSDB protocol

HSDB frames are identified by their destination address. Each device on the network uses a pre-assigned address and the KAD/HBM/102 is connected to the network at a specific device location, for example PC1. In this case, the KAD/HBM/102 acts as PC1 in the HWM HSDB protocol, and is configured to use the address corresponding to device PC1.

The pipe field is the next field used to identify messages and process them to the correct parser slot. Up to 16 different pipes (0-15) can be specified. This allows for specific packets to be processed, utilizing unique resources (memory space and processing time) at various levels of criticality. The KAD/HBM/102 can be configured to parse data from A Pipe, B Pipe, C Pipe, D Pipe, D-Debug Pipe, and HSDB Manager Pipe.

Once a message has been identified by the destination address and the pipe ID, the data contained in the message is extracted and placed in the required parser slot for reading by the Data Acquisition Unit.

### 47.3 Configuring a KAD/HBM/102 to monitor HSDB traffic

This section describes how to configure a KAD/HBM/102 to monitor Garmin G1000 HSDB traffic. To do that, you first configure the path to the location of the Garmin HSDB Interface Control Document (ICD) XML file using DAS Studio 3. (The ICD file contains the definitions of all the parameters that can be extracted from HSDB traffic.) Then you use the Garmin HSDB Importer application to import the parameter definitions from the ICD file.

#### 47.3.1 Setting up the KAD/HBM/102 with DAS Studio 3

DAS Studio 3 is used to create a configuration, which contains the various elements that make up your data acquisition system. You then use this configuration file to manage and program these elements. To see how hardware is represented in the DAS Studio 3 graphical user interface, see Figure 1 in the *DAS Studio 3 User Manual*.

Figure 47-3 on page 4 shows a KAD/HBM/102 added to the configuration with the Settings tab selected.

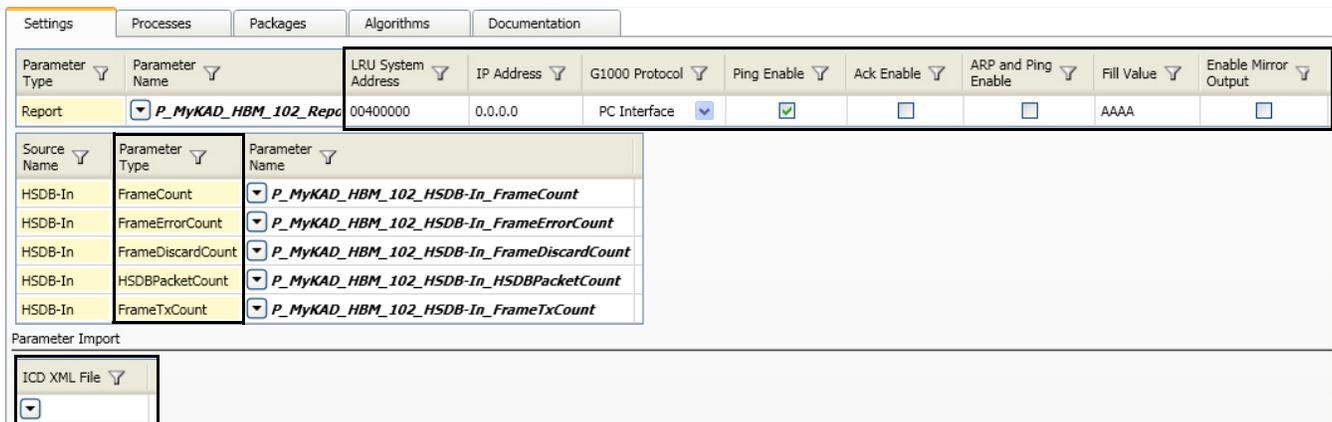


Figure 47-3: Settings tab with KAD/HBM/102 in context (default settings shown)

To configure the KAD/HBM/102 to import the ICD file, you only need to set the LRU System Address, IP Address, and the ICD XML File settings. The other settings can be left at the defaults. Refer to the following table to configure the KAD/HBM/102.

Setting	Description
LRU System Address	This is the destination address of PC1 in the HSDB network.
IP Address	This is the IP address of PC1 in the HSDB network. Ensure this is the correct IP address as data for PC1 is not sent across the HSDB network until a valid connection to PC1 is established.
G1000 Protocol	This can be set to Embedded or PC Interface. This embeds the KAD/HBM/102 location in bytes into the HSDB packets of the destination address used to identify the packets.
Ping Enable	This configures the KAD/HBM/102 to transmit ping requests across the 10BaseT HSDB network. This must be enabled for data to flow.
Ack Enable	This configures the KAD/HBM/102 to respond to ping requests received across the 10BaseT HSDB network. Enabling this setting is not required for data to be parsed, but is recommended for correct operation of the HSDB network (contact Acra Business Unit support for further information).
ARP and Ping Enable	This setting lets the KAD/HBM/102 respond to ARP and ping requests received on the 100BaseT output from the FTI network. Enabling this setting may be useful for checking the wiring to the KAD/HBM/102. However, it is not recommended for normal operation as it requires the FTI network to be on the same Ethernet subnet as the 10BaseT HSDB network. In normal operation, these are on separate networks.
Fill Value	This is the default value written to empty parser slots to identify empty messages. For debug purposes it is recommended to use an easily identifiable hex word, different from all other fill words in your system.
Enable Mirror Output	When enabled, all received HSDB data on the 10BaseT input is transmitted on the 100BaseT output. Data can then be recorded with other FTI network traffic.
Parameter Type	There are five different global counter parameters available from the KAD/HBM/102. The definitions of these parameters can be found in the <i>KAD/HBM/102</i> data sheet.
ICD XML File	This setting configures the path to the location of the Garmin HSDB ICD XML file. The ICD file contains the definitions of all the parameters that can be extracted from HSDB traffic.

### 47.3.2 Importing parameter definitions from the ICD file

After you have configured the KAD/HBM/102, use the Garmin HSDB Importer application to import the parameter definitions from the ICD file. To open the Garmin HSDB Importer application, go to the Applications menu and then click Garmin HSDB Importer (see the following figure).



Figure 47-4: Applications menu

The Garmin HSDB Importer 3 dialog box appears (see the following figure). Select the settings you want and then click Import.

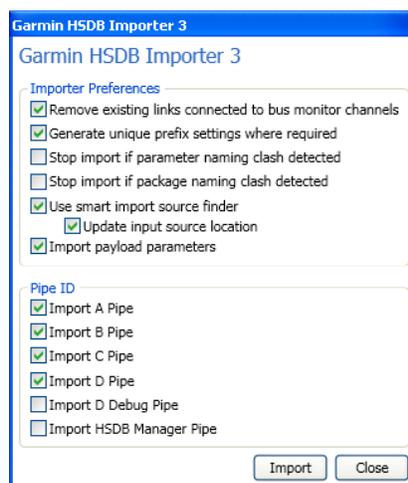


Figure 47-5: Garmin HSDB Importer dialog box (default settings shown).

Setting	Description
Remove existing links connected to bus monitor channels	Specifies whether existing links on the module's input channels are removed on import.
Generate unique prefix settings where required	If required, specifies whether unique prefixes for imported bus definitions are generated and updates the corresponding prefix setting on the KAD/HBM/102.
Stop import if parameter naming clash detected	Specifies whether import stops when a parameter naming clash is detected. By default, newly imported parameters replace existing ones.
Stop import if package naming clash detected	Specifies whether import stops when a package naming clash is detected. By default, newly imported packages replace existing ones.
Use smart import source finder	Specifies whether, when the specified XML file location (specified via a setting on the KAD/HBM/102) is not present, the importer looks for this XML file in the same location as the XidML configuration file.
Update input source location	Specifies whether the importer, after finding the CSV file in the same location as the XidML configuration, updates the location setting/URL algorithm on the importer module.
Import payload parameters	Specifies whether the importer imports the subtypes under each packet in the Garmin HSDB XML file as parameters under each package in DAS Studio 3.

Setting	Description
Pipe ID	This defines the various Pipe IDs that the importer reads and imports from the ICD file. Selecting the pipes of interest allows you to limit the number of packages and parameters that are imported into your configuration.

## 47.4 Abbreviations

Abbreviation	Description
IOP	Input/Output Processing
Fin	Bit indicating whether it is the fragment of a fragmented packet
Prd	Bit indicating whether a packet is periodic or not
SN	Sequence Number
Dest	Destination
Src	Source
Frag	Fragment
Seq	Sequence
No.	Number